What is claimed is:

1. A sample chamber for flow porometry, comprising:

a movable upper chamber comprising a center bore opening to a bottom of the chamber, at least one port for introduction of gas under pressure to the center bore and a first annular seal around the center bore;

a stationary lower seat opposing the upper chamber with a center bore aligned with the upper chamber, comprising an exhaust and a second annular seal around the center bore, wherein a material to be tested is placed between the upper chamber and the lower seat; and

an actuator for moving the upper chamber, wherein when the upper chamber is moved down with the first annular seal in contact with an upper surface of a sample of the material and the second annular seal in contact with a lower surface of the sample, gas introduced to the upper chamber is constrained to go through the upper chamber and out through the exhaust.

2. The sample chamber of claim 1, wherein the actuator is selected from the group consisting of a piston; a rack and pinion; and a motor.

3. The sample chamber of claim 1, further comprising a pressure transducer, connected to the upper chamber, which measures pressure close to the sample.

4. The sample chamber of claim 1, wherein the at least one port comprises a wetting port for introducing wetting liquid to the sample chamber.

5. The sample chamber of claim 4, further comprising a valve connected to the wetting port, which regulates a quantity of wetting liquid being discharged into the sample chamber.

6. The sample chamber of claim 1, wherein the at least one port comprises a pressure port for introducing gas under pressure.

7. The sample chamber of claim 1, further comprising a feeding mechanism, which moves the material in the sample chamber after flow porometry has been performed at a location on the sample.

8. The sample chamber of claim 1, wherein the first annular seal comprises an O-ring.

9. The sample of claim 1, wherein the second annular seal comprises an O-ring.

10. The sample chamber of claim 1, wherein the upper chamber further comprises an adapter plate located at a bottom of the upper chamber.

11. The sample chamber of claim 1, wherein the lower seat further comprises an adapter plate upon which the material to be tested is placed.

12. A method of performing flow porometry, using a sample chamber comprising a movable upper chamber comprising a center bore opening to a bottom of the chamber, at least one port for introduction of gas under pressure to the center bore and a first annular seal around the center bore, a stationary lower seat opposing the upper chamber with a center bore aligned with the upper chamber, comprising an exhaust and a second annular seal around the center bore, wherein a material to be tested is placed between the upper chamber and the lower seat, and an actuator for moving the upper chamber, wherein when the upper chamber is moved down with the first annular seal in contact with an upper surface of a sample of the material and the second annular seal in contact with a lower surface of the sample, gas introduced to the upper chamber is constrained to go through the upper chamber and out through the exhaust, comprising the steps of:

a) placing a sheet of material between the upper chamber and the lower seat;

b) moving the upper chamber down, and applying pressure with the actuator until the first annular seal and the second annular seal create a gas-tight seal around the sample; and

c) performing at least one flow porometry test by introducing gas through the port.

13. The method of claim 12, further comprising the steps of:

d) measuring a first differential pressure and a first flow rate through the sample;

e) reducing the first differential pressure to zero;

f) wetting the sample;

g) measuring a second differential pressure and a second flow rate through the sample; and

h) unloading the sample.

14. The method of claim 13, wherein step d) comprises the substeps of:

i) introducing gas into the upper chamber;

ii) allowing the gas to flow through the sample and out the exhaust; and

iii) measuring the first differential pressure and the first flow rate.

15. The method of claim 13, wherein step g) comprises the substeps of:

i) introducing gas into the hollow chamber; and

ii) allowing the gas to flow through the sample and out the exhaust;

iii) measuring the second differential pressure and the second flow rate.

16. The method of claim 13, further comprising the step of repeating steps (a) through (h).

17. The method of claim 12, further comprising the step of d) moving the material to perform a test on another part of the material.

18. The method of claim 17, wherein step d) is performed using a feeding mechanism.

19. An apparatus for performing flow porometry using a clamp-on sample chamber, comprising:

a) a sample chamber, comprising:

a movable upper chamber comprising a center bore opening to a bottom of the chamber, at least one port for introduction of gas under pressure to the center bore and a first annular seal around the center bore;

a stationary lower seat opposing the upper chamber with a center bore aligned with the upper chamber, comprising an exhaust and a second annular seal around the center bore, wherein a material to be tested is placed between the upper chamber and the lower seat; and

an actuator for moving the upper chamber, wherein when the upper chamber is moved down with the first annular seal in contact with an upper surface of a sample of the material and the second annular seal in contact with a lower surface of the sample, gas introduced to the upper chamber is constrained to go through the upper chamber and out through the exhaust;

b) a plurality of sensors for measuring flow and differential pressure; and

c) a source of gas.

20. The apparatus of claim 19, further comprising a flow porometer coupled to the sample chamber, wherein the porometer includes at least one of the sensors and a plurality of controllers, for automating the apparatus.